

DOCUMENT RESUME

ED 113 004

JC 750 558

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TITLE A Planning Model for Institutions in the North Carolina Community College System. Research Memorandum.
INSTITUTION Research Triangle Inst., Durham, N.C.
SPONS AGENCY North Carolina State Dept. of Community Colleges, Raleigh.
REPORT NO RM-Z6U-976-5
PUB DATE May 75
NOTE 41p.; Appendix, consisting of computer printouts, has been deleted from the document due to poor legibility and is not counted in pagination

EDRS PRICE MF-\$0.76 HC-\$1.95 Plus Postage
DESCRIPTORS College Planning; Enrollment Projections; Facility Requirements; *Junior Colleges; Labor Market; *Manpower Needs; Models; Program Planning; *Regional Planning; *Statewide Planning
IDENTIFIERS *North Carolina

ABSTRACT

The North Carolina Department of Community Colleges offers a variety of services which are intended to enable institutions within that state to identify, develop, and deliver their services in an efficient and effective manner. This document provides the local institution with a suggested model which might be used in the preparation of long and short-range plans that are consistent with statewide planning efforts while remaining sensitive to the needs of the students and labor markets within the communities served. A major planning service that is discussed in detail is the use of enrollment projections by major program area at the regional and institutional level, and occupational and training requirements projections at the regional level, in the preparation of the local institution's long range assessment of facility and staff needs. A manpower requirements model for an 11 county area is used to illustrate the type of data which is available. In addition, the approaches used by one institution to disaggregate such data for local use are included. (Author/LO)

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ED113004

NORTH CAROLINA COMMUNITY COLLEGE SYSTEM

PLANNING MODEL

FOR INSTITUTIONS

PREPARED FOR
NORTH CAROLINA DEPARTMENT OF COMMUNITY COLLEGES
BY
RESEARCH TRIANGLE INSTITUTE

JC 750 538

May 1975

RESEARCH MEMORANDUM

A Planning Model
for Institutions in the
North Carolina
Community College System

by

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Prepared for
North Carolina Department of Community Colleges

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A Planning Model for Institutions in
the North Carolina Community College System

I. INTRODUCTION

A. Purpose

This document presents a local institution planning model for institutions in the North Carolina Community College System. It is general in nature and is presented as a suggested approach only. Other models may be equally satisfactory in developing a long-range plan at the institutional level. However, the North Carolina Department of Community Colleges is cognizant of the fact that these plans should not only be developed in a professional manner, but also should maintain as much consistency in planning outputs, inputs, and procedures among institutions as possible. The Department has established a planning tradition that is nationally recognized and it stands ready to provide professional planning assistance to institutions in the Community College System so as to enable these institutions to identify, develop, and deliver their services in an efficient and effective manner.

This document also illustrates how information that has been developed and discussed in a previous research memorandum in this series^{1/} can be disaggregated to the local institution level within the context of this model. It suggests how this disaggregated information might be combined with other local information to support the development of a long-range institutional plan and related shorter-range plans that are based on the overall needs of the students, labor markets, and communities served by the institution.

The disaggregation and related discussion presented here uses Forsyth Technical Institute (FTI) as an example. This selection was made in consultation with Department of Community College staff and is based in part on the advanced status of long-range planning at FTI. Forsyth Technical Institute first developed a comprehensive long-range plan in May of 1971 that spanned the 1970-1980 decade.^{2/} A related set of

^{1/}Research Triangle Institute, Research Related to North Carolina Community College System Operating Program 1975-1980, RM-26U-976-3. Raleigh, North Carolina: North Carolina Department of Community Colleges, April 1975.

^{2/}Research Triangle Institute, Planning for Forsyth Technical Institute: Plans for 1970-80 Decade. Winston-Salem, North Carolina: Forsyth Technical Institute, May 1971.

plans were developed in a consistent fashion for the 1971-1975, 1971-1973, and the 1971-1972 subperiods.^{1/} Forsyth Technical Institute is currently in the process of updating primary service area--Forsyth and Stokes counties--planning information and incorporating this information into a new set of plans for the latter half of this decade.

B. Context

Long-range planning is a timely topic not only for FTI but also for all institutions in the North Carolina Community College System. The current recession, which at the time of this writing is beginning to show some indications of abatement, has contributed to recent rapid increases in enrollments at several institutions. Several hypotheses may be postulated to explain this phenomenon: the open door policy, low tuition costs, more individuals with more time available to spend in class, a heightened desire for retraining and/or the development of more than one skill, and a convenient avenue by which young adults may delay entry into the labor market. On a longer-term basis, however, it is obvious that the community colleges are continuing to gain in stature among all segments of the community. Young adults are increasingly becoming predisposed to spending their first two years of college close to home and at a public community college; several explanations may be forwarded for this tendency, including the following:

- 1) the increase in the relative cost of attending college away from home (including the cost of travel);
- 2) more extensive knowledge of the local labor market and how to search for and secure jobs within it;
- 3) the inexpensiveness, variety of course offerings, and flexibility of scheduling available at public community colleges;
- 4) the dynamic image developed by public community colleges; and,
- 5) the decrease in the monetary rewards from holding a four-year degree relative to holding a two-year degree.

Older adults are increasingly recognizing the community college as an opportunity to pursue educational interests that were either undeveloped or which could not be pursued (for whatever reason) during the young adult years. More professional people are now attending community

^{1/} Ibid.

colleges on a part-time basis to develop their vocational or part-time business interests. Other adults are recognizing that the community college is a place for upgrading skills in current lines of employment and of developing new skills that can lead to better-paying jobs that are either presently available or are becoming available in local labor markets throughout North Carolina.

All of these tendencies indicate that enrollments in the North Carolina Community College System could continue to grow at a rapid pace, even after the current recession passes. These increases will be broad-based: all age groups, all segments of society, and without regard to employment status. If the open door policy is maintained, and if funds are available to service this growth properly, then the public community college will continue to develop as a societal mixing pot within a quality educational context.

C. Background

This local institution planning model builds on experience gained in prior planning efforts that are similar in nature. The Forsyth Technical Institute planning experience has already been cited. This experience was followed by the publication of a Manpower Information Manual in June of 1973^{1/} that presents a model information system and a model for a plan prepared at the local level. The latter planning document was developed by the Department of Community Colleges as an outgrowth of the Forsyth experience, and this document has been disseminated to all institutions in the system; several institutions are currently implementing one or more of the elements in the information and the planning models.

A detailed specification of the major information elements in this model is provided in a separate document prepared by the Department of Community Colleges, dated April, 1975.^{2/} These elements include the following items:

- 1) a survey of the educational and career aspirations of high school seniors in the local service area;
- 2) a survey of the projected skill needs of labor markets in the local service area; and,

^{1/}Occupational Information Center, Manpower Information Manual: A Manual for Local Planning. Raleigh, North Carolina: North Carolina Department of Community Colleges, June 1973.

^{2/}Marcus D. Allred, The Dissemination of Local-Level, Long-Range Planning Systems to North Carolina Technical Institutes and Community Colleges. Raleigh, North Carolina: North Carolina Department of Community Colleges, April 1975.

- 3) a follow-up survey of Community College System graduates and early leavers.

This document reports on the implementation of the methodology and procedures developed for the Manpower Information Manual. It also presents a suggested format for the reporting of the survey information; a structure of activities involved in the design, collection, processing, tabulation, and reporting of the survey information, with particular emphasis on the interface between local institution and Department of Community Colleges efforts; and suggests an outline format for local institution long-range planning.

This sequence of documents builds on a Statewide and regional planning information base and methodology for planning prepared by the Research Triangle Institute for the Department of Community Colleges in June of 1970.^{1/} This effort presented an internally consistent set of time phased plans for the Community College System based primarily on estimates and projections of manpower requirements. Many of these same procedures have been utilized in the current RTI planning effort for the Department of Community Colleges, and of which the local institution planning model presented in this document is one element. The earlier RTI effort (June, 1970) led directly into the development of a set of time phased plans for Forsyth Technical Institute as discussed previously; the FTI planning effort illustrated how local planners could implement the methodology and apply the information developed at the Statewide and regional level in the June, 1970 effort. The two subsequent documents prepared by the Department of Community Colleges extended both the local area information base and the planning methodology developed through the FTI effort.

A separate but related effort has recently been completed by a representative of the Department of Community Colleges.^{2/} This effort emphasized the goal and policy formulation aspects of planning, with particular reference to the North Carolina Community College System. Surveys of various clientele served by the System were made, asking clientele members to rank actual and potential systemwide goals and related policies.

^{1/} Research Triangle Institute, Planning for the North Carolina Community College System, Volumes I-IV. Raleigh, North Carolina: North Carolina Department of Community Colleges, June 1970.

^{2/} Terrence A. Tollefson, An Assessment of Goals and Major Policies of the North Carolina Community College System as a Basis for Long-Range Planning, unpublished Ph.D. dissertation. Ann Arbor, Michigan: University of Michigan, 1975.

These responses were compared and provided the basis for a set of recommendations, both substantive and procedural, related to goals and policies for the North Carolina Community College System. In most cases the survey results underscored the appropriateness of current goals and policies established by the System.

Many other planning-related research efforts are currently underway or have been completed over the past five years under the general supervision of the Occupational Research Unit of the North Carolina Department of Public Instruction. A selected sample of research projects in this list is as follows:

- 1) a profile of students in the Community College System in 1974 (an update of similar information contained in a 1969 study);
- 2) development of a model comprehensive plan for the articulation of public high school occupational education programs with those of a community college or technical institute;
- 3) development of a management information system that can be used in measuring the effectiveness of occupational education programs; and,
- 4) development of a model to predict success in community college and technical institute occupational programs.

Several other research efforts have been addressed to the curriculum planning-implementation-evaluation process and can be utilized by local institutions, in conjunction with the more generalized planning studies referred to here, to develop more comprehensive and professional long-range institutional plans.

Interest in local institution long-range planning is not confined to the North Carolina Department of Community Colleges or its constituent institutions. The North Carolina Department of Administration and Department of Natural and Economic Resources have sponsored several long-range planning studies that have implications for Community College System planning. A recent effort^{1/} in this research program was addressed to an examination of the feasibility of alternative economic development strategies for the State and its 17 official multi-county planning regions that would serve to increase Statewide per capita personal income and to equitably distribute this increase among these regions. An earlier,

^{1/}Research Triangle Institute, Economic Development Strategy: North Carolina Economic Growth Management Study, FR-26U-952. Research Triangle Park, North Carolina: Research Triangle Institute, July 1974.

related study^{1/} was sponsored that examined the occupational and training implications of 1970-1980 trends in population and employment growth and in industrial development, and of an economic development alternative for this decade that was specified by the North Carolina Department of Administration; these implications were used to derive a set of educational policy plans for the State's three major systems of public education--the Public Schools, the Community College System, and the System of Higher Education. These studies indicate the need for strong coordination between the Department of Community Colleges and the Department of Natural and Economic Resources in planning for proper support of new and expanded industry that will serve to raise wages and levels of living of current and future North Carolina work force members.

II. GENERALIZED PLANNING MODEL

A. Introduction

A flow diagram of the generalized local institution planning model is presented in Figure 1. This figure highlights the major elements of the model and their interrelationships. Each of these major elements and their associated information requirements are described in the discussion below. Existing information sources are referenced and the need for additional information is outlined in each case. Each set of plans should be subjected to evaluation and subsequent revision after the passage of an appropriate period of time.

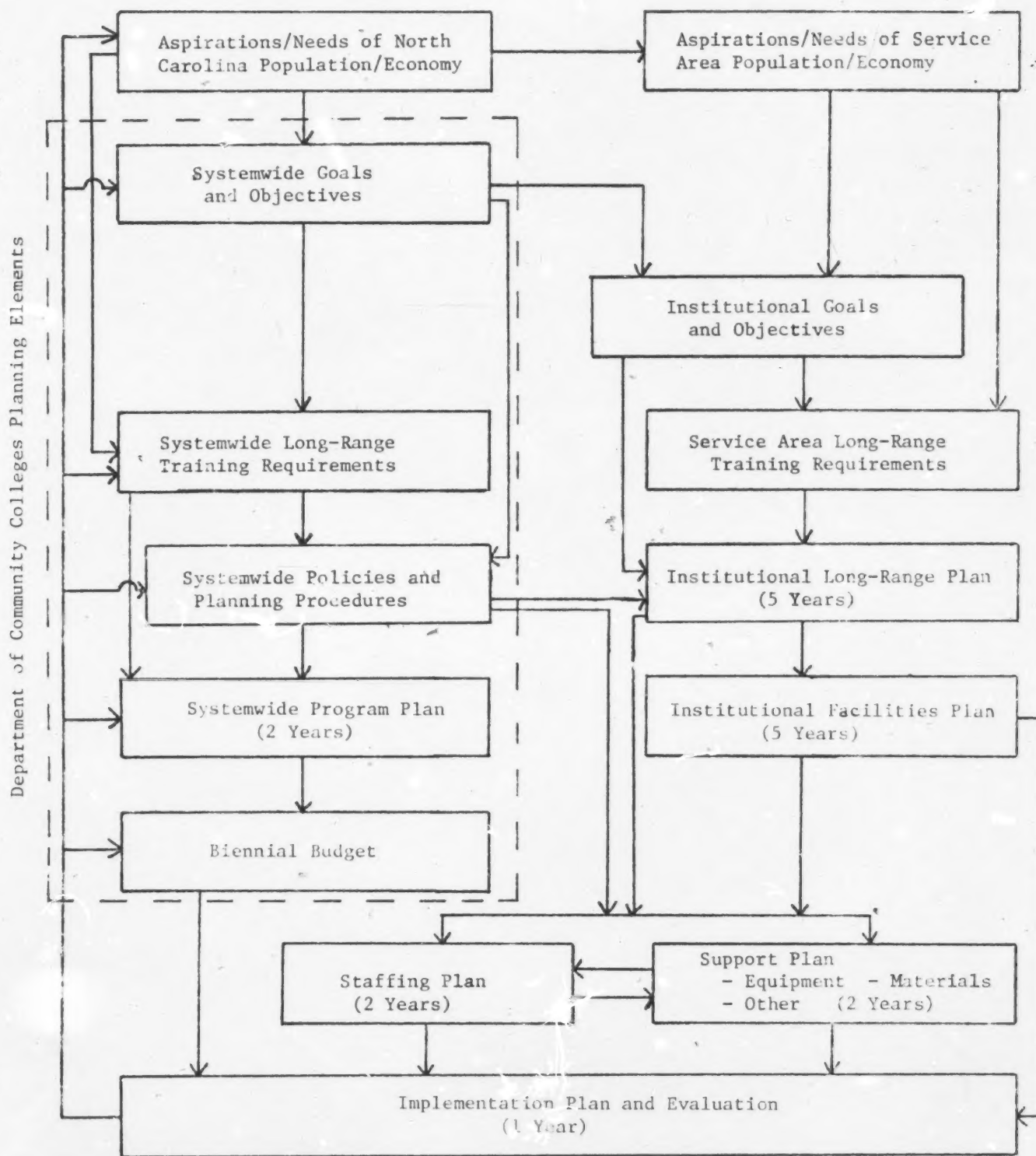
B. Systemwide Inputs to Local Planning

1. Overview

Several aspects of the systemwide planning process should be referred to prior to and during local plans preparation. Familiarity with this process at the local level will foster interinstitutional

^{1/}Alvin M. Cruze, et al., North Carolina Educational Policy Plans for the 1970's, FR-26U-787. Research Triangle Park, North Carolina: Research Triangle Institute, April 1974.

Figure 1. Generalized Local Institution Planning Mode



and State/local coordination and will help to insure the development of a set of plans that will enable the institution to maximize the likelihood of achieving the objectives set forth in the plan. As indicated earlier, the Department of Community Colleges is prepared at all times and in all instances to assist local institutions with the preparation of these plans in ways that are described below.

The feedback of local institutional planning on systemwide planning is not indicated in Figure 1 for the sake of simplicity. However, it must be emphasized that concrete plans at the systemwide level can only be developed in conjunction with the development of local plans. Thus to some extent, each of the elements within the dashed lines in Figure 1 are dependent upon local input. Local input increases the more specific the planning elements become; for example the development of a systemwide program plan (usually for a two-year period) should depend more heavily on local institution review and input than should the development of systemwide goals and objectives. All elements, however, should incorporate local institution review and input to some degree.

2. Goals and Objectives

Goals and objectives at the Statewide level should be developed with input from representatives of several population groups that can be identified as community college system clientele. Each set of these representatives needs to be periodically consulted in order to develop an updated, representative picture of the needs and aspirations of each group. This composite should then reflect in turn the needs and aspirations of the general population and economy of North Carolina.

A major first step in this direction has been taken recently with the recent completion of a study of Community College System goals and policies as they relate to systemwide long-range planning.^{1/} It is anticipated that the survey of goals discussed in this study will be repeated on a periodic basis and that the results will be

^{1/}Op. cit., Tollefson, 1975.

presented, along with a set of appropriate recommendations, to the State Board of Education for their information and guidance in setting goals, objectives, and policies at the systemwide level. These results and the actions of the State Board relative to them will then be transmitted to the local institutions for their guidance in the formulation of local institution goals and objectives and the preparations of institutional long-range goals.

Systemwide goals should be developed as general statements that do not necessarily lend themselves to measurement. Systemwide objectives, on the other hand, should be developed as specific statements related to the goal statements and which can be measured. Measurement of objectives is important in order that an evaluation of progress toward these objectives can be made. All such statements should be made as internally consistent and unequivocal as possible in order to provide clear guidance to planners and administrators at the local level. Finally, these goal statements and the specification of objectives related to them should not only be formulated on the basis of a periodic survey of representatives of community college system clientele groups, but should also reflect the needs and aspirations of the general population and the workforce in an appropriate balance. Both of these major groups are highlighted here because of the statutory mandate of the Community College System to provide both comprehensive education and occupational training.

3. Long-Range Training Requirements

The Department of Community Colleges is currently developing a capability by which to translate the aspirations and needs of the general population and workforce, plus the goals and objectives related to them, into a set of long-range training requirements for the system as a whole and for regions within the system. Previous planning research has been directed toward helping the Department establish such a capability, at least as far as the manpower portion of these overall training requirements are concerned.

These training requirements will be specified at a general level as far as 10 years into the future, and at a more specific level for five years into the future. The five year specification by major program area by region can then provide the local institution and its comparison institutions within the region invaluable information and guidance in the preparation of the long-range institutional plans. Both the ten and five year sets of training requirements can also serve in the review and appropriate modification of systemwide policies and planning procedures and in the development of a specific program plan for the system that is highly interrelated with the other planning elements and which provides concrete proposals to the North Carolina Office of State Budget and Office of State Planning, as well as to the State Legislature and to the individual institutions within the system.

4. Policies and Planning Procedures

The policies and planning procedures should be specifically tailored to enable the institutions to establish their plans in a highly satisfactory manner within the overall framework provided by the State Legislature and the State Board of Education. Policies established by the State Board should be appropriately interpreted and conveyed to local institutions in a timely manner. Planning procedures related to these policy directives should be developed by the Department and be transmitted to the local institutions as appropriate shortly thereafter. This dissemination procedure is currently operative and appears to be functioning efficiently.

These policies and the planning procedures related to them should be based not only on the specification of systemwide goals and objectives but also on the systemwide long-range training requirements developed by Department staff. This interconnection of goals, objectives, training requirements, policies, and planning procedures is suggested to insure the internal consistency of plans developed at the systemwide level and at the institutional level, so that common purposes

and efforts are emphasized throughout the system and so that costly confusion, duplications of effort, and working at cross-purposes is eliminated during the planning process insofar as possible.

5. Program Plans

A program plan is currently developed at the systemwide level consistent with the biennial budget cycle. This two year plan was instituted by the Office of State Budget and the Office of State Planning under the current administration and serves to fulfill the requirements for an annual plan of work and an annual report established under the Executive Reorganization Act of 1971.

The first systemwide program plan was developed for the 1975-1977 policy cycle. The role of this plan is still evolving, but it is anticipated that it will eventually contain both a program planning component, an implementation component, and an evaluation component. The program planning component will be based on systemwide goals and objectives, training requirements, associated policies and procedures, and on an evaluation of post program experience with input from local institutions as applicable.

This program plan is currently organized around major functions of the Department of Community Colleges, particularly the service components they render to the local institutions. As this planning document evolves, it is anticipated that it will continue to be tied closely to related planning elements but it will also be developed in greater detail in order to support the biennial budget request in a highly specific manner and to lend itself more directly to comprehensive review and evaluation. Each major program plan within the overall program plan will then logically contain the following elements:

- 1) Appropriate goal statements and related objectives;
- 2) An estimate of requirements within five- and two-year planning periods;

- 3) A set of policies and procedures related to planning for the major program area;
- 4) An evaluation of past program experience that is germane to the development of the major program plan;
- 5) A major program plan in terms of graduates, enrollments, and associated support requirements; and,
- 6) An implementation plan for each year of the program plan.

C. Local Institution Planning Elements

1. Overview

The set of systemwide planning elements and their components can be used as a guide in the preparation of local institution planning elements. The formulation of the shorter range and more detailed local institution plans as presented here are necessary to enable the Department of Community Colleges to develop a biennial budget request that is well-founded and defensible, and to enable the local institution to manage effectively the resources which have been placed at its disposal. A description of these plans and their interface with systemwide planning activities is provided in the following sections.

2. Goals and Objectives

Goals and objectives at the institutional level can be developed in a similar manner to those at the State level. Local Boards of Trustees can benefit from systemwide goals and objectives and from information from a periodic survey of the aspirations and needs of the general population and workforce in the local service area. Such information should not be developed in isolation from secondary and higher educational institutions in the service area or in isolation from other institutions in the Community College System that border on the local service area. A consortium approach to planning at this level is encouraged.

This planning element requires that local institution planners and administrators define their clientele groups in conjunction with other institutions in the consortium. Department of Community College assistance is available in each phase of this process, including clientele group selection, sampling procedures, survey instrument design, data collection procedures, data processing, data tabulation and analysis, and appropriate reporting of results in a fashion that is likely to be most meaningful to local Boards of Trustees.

3. Long-Range Training Requirements

In order to serve its constituency most effectively, the local institution should have estimates of training requirements within the local population and workforce for at least five years into the future. These estimates should be developed in a consistent manner with those of other institutions in the area and in adjacent areas, so that the local institution's role in this expanded local area training network is neither over- nor under-emphasized. Again, Department of Community Colleges assistance is available to guide the local institution in the development of these estimates.

These requirements should be estimated in terms of graduates and associated enrollments in major program areas (e.g., college transfer, general education, etc.) at a minimum. The graduates and enrollments should reflect an institutional objective of increasing the ratio of graduates to enrollments within each major program level to some target ratio by the end of the planning horizon. These requirements will comprise the central focus of the institutional long-range plan. These requirements should be specified within each major program area in sufficient detail to plan for existing program expansions (or contractions) and for new program additions. Procedures for developing this detail are discussed immediately below.

The Department of Community Colleges provide several services that can be used to help estimate long-range local training requirements for graduates. Three survey forms and dissemination procedures have already been discussed and are repeated here for the sake of convenience:

- 1) a survey of the educational and career aspirations of high school seniors in the local service area;
- 2) a survey of the projected skill needs of labor markets in the local service area; and,
- 3) a follow-up survey of graduates and early leavers from Community College System institutions.

A majority of the institutions currently engage in one or more of these survey activities to assist with curriculum design.

These survey tools can be expanded as appropriate and coordinated with those of other institutions in the local area as appropriate. For long-range planning it would be useful to survey the career plans of other high school students and to obtain some measure of the likely stability of these plans. Since an increasing portion of Community College system students--both curriculum and extension--are older adults, then a survey form to ascertain their educational and career (or career change, as applicable) aspirations is becoming increasingly appropriate. These responses can be structured for different levels of specificity and for applicability to different planning horizons. Thus this information can be used to assist the development of five-year graduation targets by major program area, to help specify new levels of activity in existing programs, and to identify requirements for new programs. These surveys could be expanded to be applicable to all appropriate institutions--secondary, community college and/or technical institute, and higher education--in the local service area.

The projected skill needs of labor markets in the local service area are currently obtained by several institutions by means of the employer survey cited earlier. The sample of firms drawn for this survey could be used as well to conduct an employee survey (with the employer's permission) of aspirations and/or needs for additional training and/or retraining. The information obtained in such surveys could be incorporated with the information discussed in the preceding paragraph to estimate major program area graduation and enrollment targets and to help specify changes in levels of existing programs and new program requirements over a shorter time span. Again, these surveys can be tailored so that they are applicable to the planning information needs of all institutions in the local service area.

The follow-up survey of graduates and early leavers with marketable skills is vital to identifying the link between education experiences and subsequent labor force or other activity in the local area. Similar instruments need to be developed for other institutions--secondary and higher education--in the local service area. Such instruments can assist local institutions in identifying the extent to which it is placing students it trains into the local service area versus other service areas, and in what capacities. It can also ascertain reasons for early leaving or other termination. All of this information can then feed back into the development of long-range training requirement estimates, particularly as it relates to existing program modification, new program requirements, and targeted relationships between program enrollments and graduates.

Existing survey instruments in each of these areas are maintained by the Department of Community Colleges and have been referenced

previously.^{1/} This reference contains additional information sources that could be accessed to supplement the survey information. The Department also offers to handle the computer processing and tabulation of the data collected by these instruments. Additional survey instruments need to be developed as discussed previously, both within the Department for local institution use and by other educational agencies. The processing and tabulation function should be extended to the data collected by the additional survey instruments prepared by the Department.

All of this local level information may then be combined with the information generated by RTI that has been reported in a previous document in this series.^{2/} The last section of this document illustrates how the multi-county planning region manpower requirements information for the 1975-1980 period generated by RTI can be disaggregated to occupational clusters relevant to curriculum program clusters at the institutional level. The institution used as an example in this disaggregation is Forsyth Technical Institute, as indicated earlier. Such information also needs to be continuously updated, at least to incorporate new baseline information as it becomes available.

4. Long-Range Plan

The core of the five-year long-range plan should be the long-range training requirements developed as discussed in the previous paragraphs, along with the related long-range planning targets. This plan should have the following elements, at a minimum:

- 1) Appropriate goal statements and related objectives;
- 2) Estimates of training requirements within broad program areas, changes in levels of existing programs, and identification of new programs, with documentation of the

^{1/} Op. cit., Allred, April 1975.

^{2/} Op. cit., Research Triangle Institute, RM-26U-976-3, April 1975.

assumptions and procedures used to derive these estimates;

- 3) Policies and procedures related to planning for each area;
- 4) An evaluation of past program experience relevant to the specification and prioritization of program planning targets;
- 5) Prioritized program planning targets, in terms of graduates and enrollments, that highlights the support requirements from the facilities plan that will be simultaneously developed;
- 6) A component for the first two years of the five-year horizon that includes at a minimum an identification of new curriculums by specific curriculum titles, and anticipated enrollments and completion rates in each; these new curriculums should be supported by the information and objectives contained in the five-year plan; and,
- 7) A review of past performance in achieving objectives contained in previous five-year plans, especially enrollment and completion targets established for major program areas and for newly instituted curriculums.

These plans should be developed simultaneously with similar plans developed for other institutions, as appropriate. Application of the planning elements and suggested general procedures in this local institution planning model will help to insure that these plans will be developed in a comprehensive manner in coordination with other major educational institutions, with the benefit of existing and proposed planning assistance services provided by the Department of Community Colleges, and in a manner that is comparable in minimum outputs and in general format with other institutions in the system.

5. Facilities Plan

A facilities plan should be developed for at least a five-year period into the future and related to the enrollment targets set out in the long-range plan. This facilities plan should begin with estimates of requirements for new or renovated space to serve existing students more effectively and to bring gross square footage up to recommended minimum levels. It should include estimates of additional square footage

required to serve enrollment expansions as targeted in the long-range plan, both at existing levels of square footage per full-time equivalent student and at recommended minimum levels of this measure.

Specific facility plans related to these requirements should then be developed and should be time-phased on several factors, including a consideration of funding constraints, necessary lead times for design and construction of each type of facility, and priorities placed on program expansion and new program development within the long-range plan.

6. Staffing Plan and Support Plan

The long-range plan should form the basis for two related plans: a staffing plan and a plan for equipment and materials support. Many institutions have extensive experience in translating program plans into associated staffing plans and support plans. Procedures used in these efforts are quite similar among institutions; it is suggested here that these plans be made for the first two years of the five-year planning period, considered with the biennial budget cycle.

The Department of Community Colleges maintains a set of Administrative Memoranda (2-1 through 2-12) that can assist the local institution in preparing both the staffing plan and the support plan. Appropriate memoranda in this series can assist the institution in translating projected enrollments on a full-time equivalent basis into instructional units, net equipment entitlements, and library book allotments, as well as how to account for other support requirements on an individual institution basis. These procedures are quite detailed but are familiar to all local institution planners and administrators. These plans are amendable once actual budget allotments are specified by the State.

7. Implementation Plan and Evaluation

The implementation plan is simply a translation of monies received in response to the staffing, support, and facilities plans into activities by individual curriculum programs and course offerings for the upcoming year. At the time the implementation plan is developed, the past year's enrollment, program completion, staffing, support, and facilities performance should be evaluated with respect to the information and objectives contained in the five-year plan.

All institutions currently engage in implementation planning, and some engage in evaluations of past performance. This model simply recognizes this step and relates it to previous plans and ultimately to institutional goals and objectives. It also suggests a planning interface between the system and the local institution, between adjacent institutions in the system, and between system institutions and adjacent institutions of other systems of education.

III. PLANNING INFORMATION PROVIDED BY MANPOWER REQUIREMENTS MODEL

A. Introduction

This section presents information developed by RTI with the assistance of a manpower requirements model that can be used in local institution planning within the framework of the local institution planning model described in the previous section. Data generated by this model include occupational employment by industry, occupational requirements based on

new job growth and anticipated vacancies in existing jobs, and training requirements by educational attainment level. These data are generated for State and multi-county planning region detail. The general types of results available from this model at the regional level are described here. These results have been used to generate a Strategic Plan for the Community College System for 1975-1985^{1/} and a related Operating Program for the subperiod 1975-1980.^{2/} The latter document also contains a disaggregation of enrollments projected with the aid of the model from the regional level to the institutional level.

Model results for Multi-County Planning Region G and the institutional disaggregation for Forsyth Technical Institute (FTI) for 1975-1980 are presented in this section, along with a further disaggregation of this information by occupational cluster for both. These model results and disaggregation procedures illustrate the usefulness of such information in institutional long-range planning when used in conjunction with survey and related information collected periodically at the local level.

B. Types of Planning Information Available

An example of the type of information generated by the manpower requirements model for the State and its 17 official multi-county planning regions is presented in the Appendix. The three tables shown are for Region G, which contains the following counties:

1. Alamance
2. Caswell
3. Davidson
4. Davie
5. Forsyth
6. Guilford
7. Randolph
8. Rockingham

^{1/}Research Triangle Institute, North Carolina Community College System Strategic Plan, 1975-1980, RM-26U-976-2. Raleigh, North Carolina, North Carolina Department of Community Colleges, January 1975.

^{2/}Op. cit., Research Triangle Institute, RM-26U-976-3, April 1975.

9. Stokes
10. Surry
11. Yadkin

The first table presents projected 1985 employment by 128 occupations cross-classified by 36 industry groups. The first seven pages in this table presents the full range of occupational employment in the first 12 industry groups only; the second set of seven pages presents the full range of occupational employment in the next 12 industry groups; and the third set of seven pages presents the full range of occupational employment in the last 12 industry groups. Thus the 21 pages in this table are required to present the full range of industry group employment, in three blocks of 12 industry groups each, with each block containing seven pages. The industry groups and occupations presented here are keyed to similar classifications in the 1970 Census of Population and are described in detail elsewhere.^{1/} The occupations are arranged in rough order of decreasing skill requirements; the first occupations listed are those in the professional, technical, and kindred category, and the last occupations are in the lower-skilled service worker category. The industry groups are arranged in the order in which they appear with the Standard Industrial Classification (SIC) system prepared by the U.S. Office of Management and Budget.^{2/}

The second table in the Appendix presents projected 1985 employment by occupation; comparison estimated 1970 employment by occupation; the difference between the two (labelled "industrial change"); estimates of the numbers of 1970 employed workers who will leave the occupation over

^{1/}U.S. Bureau of the Census, 1970 Census of Population: Classified Index of Industries and Occupations. Washington, D.C.: U.S. Department of Commerce, September 1971.

^{2/}U.S. Office of Management and Budget, Standard Industrial Classification Manual. Washington, D.C.: U.S. Bureau of the Budget, 1972.

the 1970-1985 period for reasons of death, retirement, and childbirth without subsequent return (labelled "net separations"); and the sum of the "industrial change" component and the "net separations" component (labelled "total requirements"). The percentages refer to the share of the preceding entry in the column total. The total requirements column represents estimates of occupational requirements projected for the 1970-1985 period; the previous two columns represents estimates of these requirements by source. In this table the occupations are listed in the same order as in the previous table but here they are blocked into major occupational groups (e.g. professional, technical, and kindred workers) for ease of interpretation.

The last two tables, Tables 6A and 6B, are similar in that the numbers in the former table are generated by applying the percentages in the latter table to the projections of occupational requirements. Table 6A thus contains projections of training requirements at each educational attainment level for each occupation. These projections represent the training requirements within each occupation if Region G workers are to be trained to levels commensurate with their U.S. counterparts in those same occupations. The total number of workers requiring training within a given occupation is projected to be the number of workers required to fill job openings expected to arise in that occupation over the 1970-1985 period in the Region G economy.

The last table, Table 6B, presents the educational attainment pattern within each occupation projected for new entrants into these occupations over the 1970-1985 period in the U.S. economy. These education attainment patterns are expressed as percentages of total requirements within each occupation. They are used to generate the projections of training requirements by occupation and total training requirements presented in Table 6A.

C. Example of Institutional Disaggregation

1. Methodology

The occupational detail available in the projections presented in the Appendix may be used to further disaggregate the projections of average annual enrollments by broad program area for institutions

in Region G into occupational clusters for curriculum programs. The projections of institutional enrollments--both unduplicated headcount and full-time equivalent--by broad program area have been reported for the 1975-1980 planning period in an earlier document in this series.^{1/} The manpower requirements model was used to derive enrollments by major program area at the regional level; the breakdown of these figures to the institutional level was accomplished by examining trends in institutional shares of regional enrollments by major program area and by examining plans for institutional expansion over the 1975-1980 period.

The annual average curriculum program unduplicated headcount (UHC) enrollments for Region G and for Forsyth Technical Institute for the 1975-1980 planning period from this previous document are repeated here in Exhibit 1. These numbers are to be interpreted as average annual UHC enrollments for an "average" year during this planning period; this "average" year is generally assumed to be the midpoint year during the planning period. These numbers will be disaggregated into occupational clusters for Region G and Forsyth Technical Institute (FTI) with the aid of the projections of the educational attainment distribution of occupational requirements in the Appendix. The occupational clusters are essentially those defined for planning purposes by the Department of Community Colleges.^{2/} The document containing these definitions uses Dictionary of Occupational Titles^{3/} codes to define the clusters; the occupations in the Appendix are census-defined occupations and do not necessarily bear a one-to-one resemblance with those in the Dictionary of Occupational Titles. For this reason, Exhibit 2 lists the occupational clusters and the occupations from the Appendix which they most likely contain. Exhibit 3 lists the occupational clusters and the curriculum programs in Region G which they most likely contain.

^{1/}Op. cit., Research Triangle Institute, RM-26U-976-3, April 1975.

^{2/}Op. cit., Allred, April 1975.

^{3/}U.S. Bureau of Employment Security, Dictionary of Occupational Titles, Volumes I-III. Washington, D.C.: U.S. Department of Labor, Manpower Administration, 1965.

EXHIBIT 1

Annual Average Enrollment Projections by Curriculum
Program for Region G and Forsyth Technical Institute,
1975-1980 (Average Annual Unduplicated Headcount Basis)

	Region G	Forsyth Technical Institute
College Transfer	3,510	
General Education	7,000	500
Technical	11,040	1,700
Vocational	8,280	1,610

SOURCE: Research Triangle Institute, Research Related to North Carolina Community College System Operating Program 1975-1980, RM-26U-976-3. Raleigh, North Carolina: North Carolina Department of Community Colleges, April 1975, p. 25.

EXHIBIT 2

Suggested Match Between Occupational
Clusters and Occupations^{1/}

Occupational Cluster^{2/}
Occupation Titles^{3/}

A. Service Occupations

Bakers
Cooks, Except Private Household
Waiters and Foodcounter Workers
Busboys and Dishwashers
Other Food Service Workers
Cleaning Service Workers
Dressmakers and Seamstresses, Except Factory
Firemen and Fire Protection Workers
Guards and Watchmen
Policemen and Detectives
Other Protection Service Workers
Health Service Workers
Personal Service Workers
Private Household Workers
Service Workers, Except Private Household

B. Maintenance, Construction, Repair and Powerplant Occupations

Cabinetmakers
Carpenters
Excavators, Graders, and Road Machine Operators
Electricians
Masons and Tile Setters
Painters and Paperhangers
Plasterers and Cement Finishers
Plumbers and Pipefitters
Other Construction Craftsmen
Linemen and Servicemen Telephone and Powerplant
Air Conditioning, Heating, and Refrigerator Mechanics
Aircraft Mechanics and Repairmen
Automobile Mechanics, Including Body
Radio and T.V. Repairmen
Other Mechanics and Repairmen
Garage Workers and Gas Station Operators
Foremen, n.e.c.
Laborers, Except Farm

EXHIBIT 2 (continued)

Occupational Cluster^{2/}
Occupation Titles^{3/}

C. Managers, Officers and Sales Occupations

Accountants
Buyers, Purchasing Agents, and Sales Managers
Restaurant, Cafe, and Bar Managers
School Administrators
Specified Managers and Administrators
Other Specified Managers and Administrators
Managers and Administrators, n.e.c.--Salaried
Managers and Administrators, n.e.c.--Self Employed
Religious Workers
Social Scientists
Social and Recreation Workers
College and University Teachers
Elementary and Prekindergarten Teachers
Secondary Teachers
Other Teachers
Insurance, Real Estate Agents, Brokers and Underwriters
Demonstrators, Hucksters, and Peddlers
Sales Representatives, Manufacturing Industries
Sales Representatives, Wholesale
Sales Clerks, Retail
Salesmen, Retail
Salesmen of Services and Construction
Other Sales Workers

D. Technician Occupations

Architects
Computer Specialists
Aeronautical and Astronautical Engineers
Civil Engineers
Electrical and Electronic Engineers
Mechanical Engineers
Other Engineers
Librarians
Dietitians
Registered Nurses
Therapists
Writers, Artists, and Entertainers
Life and Physical Scientists
Health Technologists and Technicians
Engineering and Science Technicians
Technicians, Except Health, Engineering and Science

EXHIBIT 2 (continued)

Occupational Cluster^{2/}
Occupation Titles^{3/}

D. Technician Occupations (continued)

Other Professional, Technical, and Kindred Workers
Machinists, Job and Die Setters
Sheetmetal Workers, Tinsmiths
Tool and Die Makers
Other Metal Craftsmen
Stationary Engineers and Power Station Operators
Other Craftsmen and Kindred Workers
Compositors and Typesetters
Pressmen and Plate Printers, Printing
Other Printing Craftsmen

E. Clerical Occupations

Bank Tellers and Cashiers
Booking and Billing Clerks
Counter Clerks, Except Food
Enumerators and Interviewers
File Clerks
Mail Handlers and Postal Workers
Booking and Billing Machine Operators
Key Punch Operators
Other Office Machine Operators
Payroll and Timekeeping Clerks
Receptionists
Secretaries
Stenographers
Telephone Operators
Typists
Other Clerical Workers

F. Other Occupations

Assemblers
Checkers, Examiners, and Inspectors, Manufacturing
Bottling and Canning Operatives
Laundry and Dry Cleaning Operatives, Including Ironers
Graders and Sorters, Manufacturing
Sewers and Stitchers
Meat Cutters and Butchers
Mine Operatives, n.e.c.
Packers and Wrappers, Except Produce
Painters, Manufactured Articles

EXHIBIT 2 (continued)

Occupational Cluster^{2/}
Occupation Titles^{3/}

F. Other Occupations (continued)

Precision Machine Operators
Sawyers
Stationary Firemen
Textile Operatives
Welders and Flamecutters
Metalworking Operatives
Other Specified Operatives
Miscellaneous and not Specified Operatives
Transportation Equipment Operators
Locomotive Engineers and Firemen
Farm and Farm Managers
Paid Farm Laborers and Foremen
Unpaid Family Farm Workers

^{1/} It should be noted that this matching of occupations to occupational cluster is only suggested; more extensive matching than presented here may be used for certain occupations, particularly where a given occupation is only broadly defined. More extensive matching is also applicable for a given occupational cluster which requires a wide range of education, training, and job skills.

^{2/} These groupings are found in The Dissemination of Local-Level, Long-Range Planning Systems to North Carolina Technical Institutes and Community Colleges, Marcus D. Allred, North Carolina Department of Community Colleges: Raleigh, North Carolina, April 1975. For purposes of this report, two groupings, Managers and Officers and Sales Occupations, are combined and one group, Other Occupations, is added.

^{3/} These occupational titles are found along with Statewide projections for each occupation in North Carolina Community Colleges System Operating Program 1975-1980, Research Triangle Institute RM-26U-976-3 prepared for North Carolina Department of Community Colleges, April 1975. Similar projections are available for each region.

SOURCE: Research Triangle Institute.

EXHIBIT 3

Suggested Match Between Occupational Clusters and North Carolina
Department of Community Colleges Curricula
Currently Available in Region G^{1/}

Occupational Cluster^{2/}
Curriculum Number^{3/}
Curriculum Title^{3/}

A. Service Occupations

T 063 Fire Science
T 064 Police Science
T 073 Early Childhood Specialist
V 009 Cosmetology
V 038 Practical Nursing
V 067 Child Care Worker

B. Maintenance, Construction, Repair and Powerplant Occupations

T 036 Air Conditioning and Refrigeration
T 095 Transportation Maintenance
V 001 Automotive Body Repair
V 003 Automotive Mechanics
V 007 Carpentry and Cabinetmaking
V 013 Diesel Vehicle Maintenance
V 018 Electrical Installation and Maintenance
V 024 Air Conditioning and Refrigeration Service
V 029 Light Construction
V 033 Industrial Mechanics
V 037 Plumbing and Pipefitting
V 042 Electronic Servicing
V 050 Welding
V 099 Guided Studies--Vocational

C. Managers, Officers, and Sales Occupations

C 003 Pre-Art
C 004 Pre-Business
C 009 Pre-Journalism
C 010 Pre-Law
C 011 Pre-Liberal Arts
C 015 Pre-Music
C 019 Pre-Social Work
C 020 Pre-Teaching--Elementary
C 024 General Curriculum
C 028 Pre-Teaching--Secondary
C 029 Pre-Recreational
C 030 Guided Studies (Preparatory Course)
T 016 Accounting
T 018 Business Administration
T 020 Marketing and Retailing Technology
T 034 Traffic and Transportation
T 049 Industrial Management Technology
T 074 Food Service Management
T 082 Aviation Management and Career Pilot
T 090 Textile Technology and Management

EXHIBIT 3 (continued)

Occupational Cluster^{2/}
 Curriculum Number^{3/}
 Curriculum Title^{3/}

D. Technician Occupations

C 005 Pre-Dental
 C 007 Pre-Engineering
 C 008 Pre-Forestry
 C 012 Pre-Mathematics
 C 013 Pre-Medical
 C 017 Pre-Pharmacy
 C 018 Pre-Science
 C 022 Pre-Physical Therapy
 C 023 Pre-Nursing
 T 022 Electronic Data Processing--Business
 T 023 Electronic Data Processing--Science
 T 037 Chemical Technology
 T 038 Civil Engineering Technology
 T 041 Architectural Technology
 T 043 Mechanical Drafting and Design
 T 045 Electronics Engineering Technology
 T 047 Industrial Engineering Technology
 T 050 Manufacturing Engineering Technology
 T 054 Dental Hygiene
 T 056 Mental Health Association
 T 059 Associate Degree of Nursing (Registered Nurse)
 T 061 Radiologic Technology
 T 066 Audiovisual Technology
 T 068 Commercial Graphics
 T 069 Photography Technology
 T 070 Commercial Art and Advertising Design
 T 072 Technical Illustrating
 T 077 Interior Design
 T 087 Journalism
 T 099 Technical Guided Studies (Preparatory Non-Credit Courses)
 T 104 Nuclear Medicine Technology
 T 114 General Occupational Technology
 T 121 Machinists Technology
 V 011 Dental Assistant
 V 015 Drafting--Building Trade
 V 017 Drafting--Mechanical
 V 022 Graphic Arts--Printing
 V 032 Machinists

E. Clerical Occupations

T 029 Secretarial--Engineering and Technical
 T 030 Secretarial--Executive
 T 031 Secretarial--Legal
 T 032 Secretarial--Medical
 T 033 General Office Technology

EXHIBIT 3 (continued)

Occupational Cluster^{2/}
Curriculum Number^{3/}
Curriculum Title^{3/}

F. Other Occupations

G 020 General Education
G 030 Special Credit Student
T 001 Agricultural Business Technology
T 009 Ornamental Horticulture
T 012 Floral Design and Shop Management
T 013 Soil and Water Conservation
T 126 Agricultural Science
V 021 Horticulture
V 082 Upholstering
V 084 Upholstery Cutting
V 086 Upholstery Sewing

^{1/} It should be noted that this matching of curricula to occupational clusters is only suggested; more extensive matching than presented here may be used for certain curricula particularly where a given curriculum is only broadly defined and may serve a wide variety of occupations. More extensive matching is also applicable for a given occupational cluster which requires a wide range of education, training, and job skills.

^{2/} These groupings are found in The Dissemination of Local-Level, Long-Range Planning Systems to North Carolina Technical Institutes and Community Colleges, Marcus D. Allred, North Carolina Department of Community Colleges: Raleigh, North Carolina, April 1975. For purposes of this report, two groupings, Managers and Officers and Sales Occupations, are combined and one group, Other Occupations, is added.

^{3/} North Carolina Department of Community Colleges.

SOURCE: Research Triangle Institute.

The matching information from Exhibit 2 has been used to separate the projections of training requirements at the "high school graduate with post-secondary technical and vocational training" and the "college 1-3" educational attainment levels for 1970-1985 into the designated occupational clusters for Region G. The matching information from Exhibit 3 has been used to separate average annual UHC curriculum program enrollments for Region G and FTI during 1973-1974 into the same occupational clusters; this information is presented for comparison purposes. The training requirements by occupational cluster for 1970-1985 were used to compute shares by cluster which were then used to disaggregate the 1975-1980 average annual UHC enrollments for the "average" year during the 1975-1980 period into these same occupational clusters for both Region G and FTI.

Details of this procedure are as follows. First, organize the occupations listed in Table 6A in the Appendix into occupational clusters as defined in Exhibit 2. For each occupation, add the training requirements at the "high school graduate with post-secondary training" and the "college 1-3" educational attainment levels. Next, add these totals across individual occupations to form occupational cluster training requirement totals.

Form shares of each cluster total in the total training requirements for all clusters added together. Multiply these shares by the projected curriculum program enrollment level totals for the region that are cited in Exhibit 1. The result of this multiplication is a preliminary projection of enrollments by occupational cluster within the region.

A refined projection of regional enrollments is then made by adjusting for differential rates of program completion and labor force entry among curriculums in different occupational clusters. The organization of existing curriculums into occupational clusters is presented in Exhibit 3. This refinement should allow for larger enrollments in clusters with curriculum programs that have lower rates

of program completion and/or lower rates of labor force entry. However these adjustments should not alter the projections of total enrollments (over all clusters). The reason for this adjustment is that the use of shares based on occupational requirements to disaggregate enrollment projections can understate enrollments in programs with low completion rates and/or low rates of labor force entry. Such programs need a larger number of enrollments to ultimately produce a given number of labor force new entrants. These labor force new entrants fill the training requirements on which the shares for disaggregation are based.

The next step in the disaggregation process is to compute enrollments by cluster for a given institution (in this case FTI) from the enrollments by cluster computed at the regional level. This step can be made by examining historical trends in shares of institutional in regional enrollments on a cluster by cluster basis. A strict extrapolation of these shares may not be warranted if either the institution under consideration or other institutions in the region are preparing to embark on major program expansions in certain program areas that would represent a significant alteration in historical trends. In these cases the extrapolation of historical trends in shares of institutional in regional enrollments for the affected clusters would have to be appropriately modified. This step thus requires close planning coordination among institutions in the region. The resulting projections of cluster enrollments may have to be adjusted slightly to bring them into agreement with the projections of total enrollments for the institution.

The result of this multi-step procedure is enrollments by cluster for an individual institution in the region. This is a suggested procedure, and it may be revised slightly to accommodate additional information, occasional other considerations that may be significant for a given institution, or additional considerations that may be warranted under certain circumstances specified by the Department of Community Colleges.

2. Results

The results of this disaggregation for Region G and for FTI are presented in Exhibit 4. This Exhibit also contains the 1973-1974 comparison level enrollments by occupational cluster. The major expansion potential for Region G appears to be in the clerical cluster. The major expansion potential for FTI also appears to be in the clerical cluster. Note that these comparisons are for the period from 1973-1974 to an "average" year during the 1975-1980 period (e.g. 1977-1978). The projections are most appropriately considered as enrollment potentials that are related to manpower requirements; they are not constrained by facilities or other limitations. They reflect only the manpower requirements component of college transfer and general education enrollments, yet for all program areas and occupations they contain the training effort required to keep up with the educational attainment level of U.S. workers on an occupation-by-occupation basis.

The regional information presented in Appendix can thus be incorporated into the institutional long-range plan and can serve as an integral component of that plan. These numbers should not stand alone however. They need to be appropriately combined with local service area labor market survey information as introduced earlier to gain additional occupational detail and to provide a rough check on the numbers derived from the manpower requirements model for the region and the institution.

Once the long-range plan has been appropriately constructed with the aid of these manpower-based projections, the same sources of information can be used along with recent employment information available from local Employment Security Commission offices and information on anticipated employment additions in new and expanded industry available from the regional office of the North Carolina Department of Natural and Economic Resources and from local industrial development representatives to disaggregate further the manpower-based five-year information into two-year information.

EXHIBIT 4

Disaggregation of Average Annual Unduplicated Headcount Enrollment by Occupational Cluster

Occupational Cluster	Region G ^{1/}		Forsyth Technical Institute	
	1973-74	1975-1980	1973-74	1975-80 ^{1/}
A. Service Occupations	875	2,500	210	670
B. Maintenance, Construc- tion, Repair and Powerplant Occupations	1,939	3,895	426	960
C. Managers, Officers, and Sales Occupations	4,591	5,896	235	335
D. Technician Occupations	3,129	3,316	636	751
E. Clerical Occupations	780	7,528	73	789
F. Other Occupations	1,892	3,185	162	305
TOTAL	13,205	26,320	1,742	3,810

^{1/} Figures are for an average year (e.g., 1977-78) over the 1975-1980 period.

SOURCE: Research Triangle Institute.

to assist in the preparation of the institutional program plan. The gathering and use of all this information should be done in concert with other institutions in the region--Community College System institutions and institutions of secondary and higher education--and with the aid of planning assistance available from the Department of Community Colleges. This coordinated planning approach not only will insure that plans are developed in a comprehensive and professional manner, but will also help insure that these plans reflect a cost-effective use of the State and local areas scarce financial resources.

IV. SUMMARY

This document provides the local institution with a synopsis of planning services provided by the Department of Community Colleges and a suggested model of how these services might be used by the local institution in the preparation of a set of plans that is consistent with systemwide planning efforts currently being pursued by the Department. This set of plans will assist the local institution in serving its constituency in an efficient and effective manner as well as provide valuable input into systemwide planning.

A major planning service that is discussed in detail is the use of enrollment projections by major program area at the regional and institutional level, and occupational and training requirements projections at the regional level, in the preparation of the local institution long-range plan. All such projections have been made with the aid of a manpower requirements model as discussed previously. These projections offer the local institution a valuable set of planning information that may be used in conjunction with other planning information that can be generated at the local level and used to develop the set of plans contained in Figure 1. Assistance in accessing and developing this planning information is currently offered by the Department of Community Colleges and is available to any interested institution.

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